

Digital Schlieren System for Flow Diagnostics, Phase I

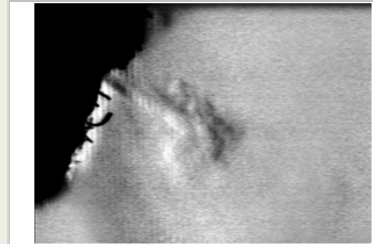
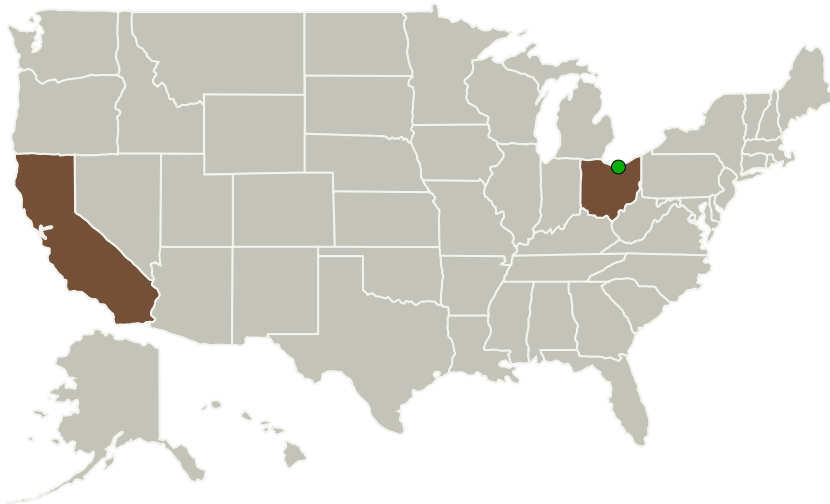
Completed Technology Project (2014 - 2014)



Project Introduction

This is an SBIR proposal to develop a revolutionary digital schlieren imaging system that will greatly improve a widely used aerodynamics tool and render it so robust, user friendly, and productive that it will be useable in test facilities and environments that have been prohibitive before. Also, by incorporating recent advances in consumer camera and display technologies we can produce a new class of digital focusing schlieren (DFS) systems that drastically reduce the manufacturing costs as well as the size and weight, while maintaining sensitivity, improving robustness, making it more user friendly, and over all a much more powerful instrument. The digital schlieren concept represents the first major improvement in schlieren imaging in over 150 years, a true quantum jump in the technology. Conversion to digital obviates many of the long-standing problems with focusing schlieren systems that are associated with precisely matching the cutoff grid to the background light pattern. Because the system is digital, the control software can perform real-time image enhancement as well. Consequently, the most severe hardware production and alignment restrictions are now software problems that are solvable continuously, quickly, and inexpensively in real time. This capability enables the system to compute and compensate for imperfect windows and optics, optical aberrations, misalignments, and temporal changes in the system and subject.

Primary U.S. Work Locations and Key Partners



Digital Schlieren System for Flow Diagnostics Project Image

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Organizations Performing Work	Role	Type	Location
Spectabit Optics, LLC	Lead Organization	Industry	Laguna Hills, California
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

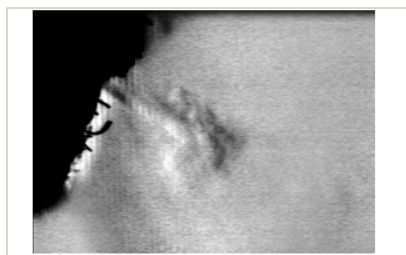
Primary U.S. Work Locations	
California	Ohio

Project Transitions

**June 2014:** Project Start**December 2014:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/137480>)

Images

**Project Image**

Digital Schlieren System for Flow Diagnostics Project Image
(<https://techport.nasa.gov/image/132773>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Spectabit Optics, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

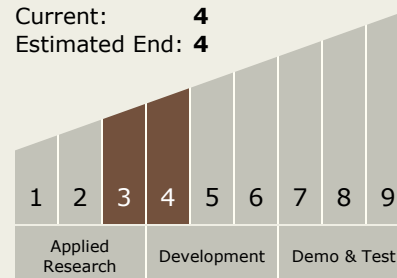
Benjamin D Buckner

Technology Maturity (TRL)

Start: **3**

Current: **4**

Estimated End: **4**



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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.2 Test and Qualification
 - └ TX13.2.1 Mechanical/Structural Integrity Testing

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System